Dell Networking S5000

Modular 1RU 10/40GbE and FC 2/4/8 switch

High-density 1RU 1/10GbE or 2/4/8G FC modules with four fixed 40GbE uplinks and low latency for line-rate performance, feature-rich layer 2/3 and storage networking for iSCSI, FC/FCoE and RoCE.

The Dell S5000 1RU Ethernet switch offers innovative modular, converged networking capabilities. The switch converges LAN and SAN traffic over a single 10GbE connection to help optimize server and storage connectivity in enterprise-scale data centers deploying separate networks based on different networking protocols.

Converged LAN/SAN ToR switch

The Dell S5000 is a 10/40GbE switch architected for a ToR virtualized data center environment. It provides a fully modular converged LAN/SAN switch purpose-built for applications in high-performance data center and fabric deployments. The S5000 supports LAN and native Fibre Channel ports using optional modules for maximum flexibility and scalability.

Leveraging a non-blocking, cut-through switching architecture, the S5000 provides line-rate L2 and L3 forwarding capacity with low latency to maximize network performance. The S5000 is a fully modular switch with four modular bays and four fixed 40GbE uplink ports. Each 40GbE QSFP+ uplink can also support four 10 GbE ports using a breakout cable. The S5000 supports three types of modules, including a Unified port module with 12 configurable ports for Fibre Channel 2/4/8Gbps and/or 1/10GbE SFP+, as well as SFP+ or 1/10GBASE-T Ethernet modules, each providing 12 1/10GbE ports.

The S5000 is powered by the industry-hardened, feature-rich Dell Networking OS9 (OS9) designed for maximum dependability and uptime. Virtual link trunking (VLT) provides a loop-free topology with active-active load-sharing of links from access to core. Hardware stacking using front port stacking up to six units provides maximum flexibility and scalability for data center environments. The S5000 supports Dell Open Automation Framework, which provides advanced network automation and virtualization capabilities for virtual data center environments. The Open Automation Framework is comprised of a suite of interrelated network management tools which can be used together or independently to provide a more flexible, available and manageable network while helping to reduce operational expenses.

Key applications

- Lossless fabric for LAN/SAN deployments
- Design with the Dell Z Series core switch to create a flat, two-tier, non-blocking 1/10/40GbE data center network design
- Design a Clos fabric with S5000 switch in leaf and spine with the S Series 1/10GbE Ethernet switches for cost-effective aggregation of 10GbE uplinks
- Design with Dell N Series switches to create a modern campus network with pay-as-you-grow expansion capability or consolidate campus aggregation and small data center functionality
- High-performance SDN/OpenFlow 1.3 enabled with ability to inter-operate with industry standard OpenFlow controllers
- 1/10GBase-T and SFP+ modules available on the same ToR switch

Key features

- OS9 offers inherent stability as well as advanced monitoring and serviceability functions
- Open Automation Framework adds VM-awareness as well as automated configuration and provisioning capabilities to simplify the management of virtual network environments
- Scalable L2 and L3 Ethernet switching with QoS and a full complement of standards-based IPv4 and IPv6 features
- VLT and mVLT for layer 2 multipath
- User port stacking support for up to six units
- Support for jumbo frames for high-end server connectivity
- 128 link aggregation groups with up to eight members per group, using advanced hashing
- Fibre Channel, FCoE, FCoE transit (FIP Snooping) and NPIV Proxy Gateway (NPG), Fibre Channel Forwarding (FCF)
- Full data center bridging (DCB) support for lossless iSCSI SANs, RoCE and converged network.
- Redundant, hot-swappable power supplies and fans
- I/O panel to PSU airflow or PSU to I/O panel airflow (reversable airflow)
- VRF-lite enables sharing of networking infrastructure and provides L3 traffic isolation across tenants
- 16, 28, 40, 52, 64 10GbE ports available

A modular, compact form-factor switch optimized for LAN and SAN convergence and easy 1GbE to 10GbE migration

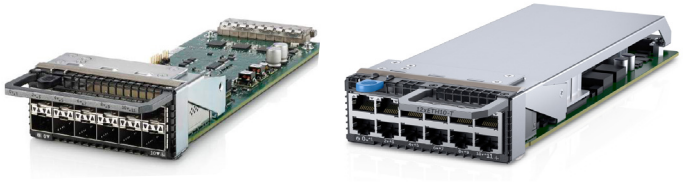
Dell S5000 overview

Server virtualization and cloud-based deployment models are increasing IT organizations' productivity while improving their ability to respond to continuously changing business needs. However, the rate at which the technology is evolving is forcing IT departments to invest in solutions that are flexible, future-ready and cost-effective.

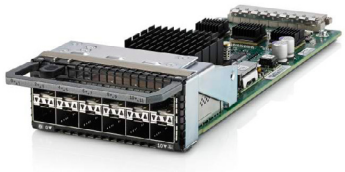
The Dell S5000 is a high-density 1RU switch that offers innovative flexibility due to its unique modular architecture. S5000 is well suited for data center access and aggregation layer deployments for physical and virtual servers and LAN and SAN convergence over lossless fabrics.

- 1RU high-density switch with four module slots and four fixed 40GbE (QSFP+) uplinks (totaling 64 10GbE ports with breakout cables)
- Three optional modules are SFP+ Ethernet, 1/10GBase-T Ethernet, and a Unified Module supporting Fibre Channel and/or SFP+ Ethernet. The Ethernet modules support 12 1/10GbE ports and the Unified Module supports up to 12 FC 2/4/8Gbps and/or 12 1/10GbE ports.
- 1.28Tbps (full-duplex) non-blocking, cut-through switching fabric delivers line-rate performance
- FCoE, iSCSI and RDMA over Converged Ethernet (RoCE) is supported on all Ethernet ports

S5000 I/O module options



Ethernet modules (above) provide 12 1/10GbE ports using SFP+ (left) or 1/10GBASE-T (right) interfaces. The Ethernet modules support Ethernet-based LAN traffic and Ethernet-based SAN traffic for FCoE and iSCSI. and RoCE.



Unified port module (above) provides up to 12 ports for 2/4/8Gbps native Fibre Channel using SFP+/SFP interface. The unified port module supports Fibre Channel-based SAN traffic as well as up to 12 FC 2/4/8 and/or 12 1/10GbE ports.

Deployment models for S5000

Dell S5000 supports deployment models for small campus core or traditional, virtualized and converged data centers.

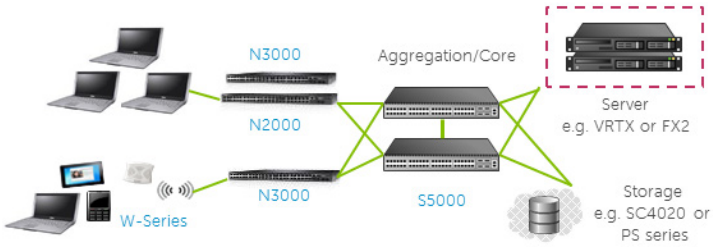


Figure 1. Campus deployment models for S5000

The flexibility of scale and types of ports offered by the S5000 make it an attractive choice for small campus core switches. Customers have the ability to connect legacy or new 1GbE switches to S5000 using 1GbE or 10GbE uplinks. Many small campuses also have a mini data center deployed within the wiring closet. In these environments, IT staff are forced to either deploy multiple switches to meet the needs of servers and storage in the wiring closet or try to fit server and storage workloads in the campus networks. With the S5000, customers have the ability to install the types of modules that best meets the needs of campus and data center workloads in the wiring closet.

Traditional Ethernet deployments

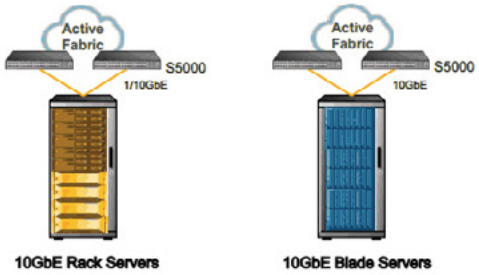


Figure 2. Redundant connections from 10GbE rack and blade servers deployed in a traditional Ethernet environment

Each server rack in this deployment model contains two S5000 switches offering redundant 10GbE connections to each server. The switches may be deployed as stand-alone switches or stacked for management simplification. Typical stacking configurations include a pair of stacked switches in each rack or two stacks of switches extending horizontally across multiple switches. In a typical single high-density server rack with redundant connections, up to 48 Dell PowerEdge rack servers or up to 96 PowerEdge Blades can be connected to a pair of S5000 in a single rack.

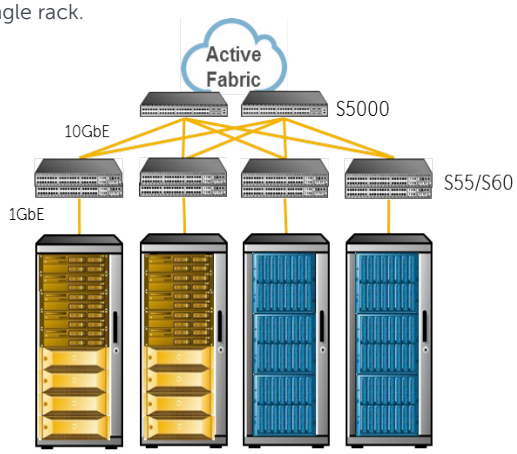


Figure 3. Large-scale 1GbE server connections

Servers with 1GbE redundant ports are connected to a pair of Dell Networking S55 or S60 1GbE switches. Using 10GbE up link connections, S55 or S60 leaf switches are connected to a pair of S5000 spine switches to form a large access layer fabric. In a typical high-density server configuration with redundant connections, up to 576 1GbE (1152 if redundancy not required) servers can be connected to a pair of S5000 switches through 24 Dell S55 or S60 switches.

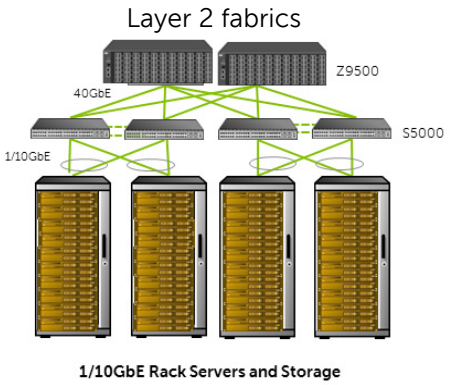


Figure 4. 1/10GbE rack servers in a virtualized data center

Virtual Link Trunking (VLT) is a Dell Networking multi-path solution to create a dynamic or static LAG that terminates on two different VLT-enabled physical switches. VLT is a dual active control plane implementation of multi-system LAG. VLT creates a single logical view of the two physical switches for the node at the other end.

In a virtualized data center, each server can transmit a significant amount of data easily overwhelming a traditional network infrastructure. VLT-based network infrastructure provides active-active connections from the server expanding the available bandwidth while increasing network resiliency. In a typical high-density server configuration with redundant connections, up to 1188 1/10GbE servers can be connected to a pair of Z9500 switches through 66 S5000 switches.

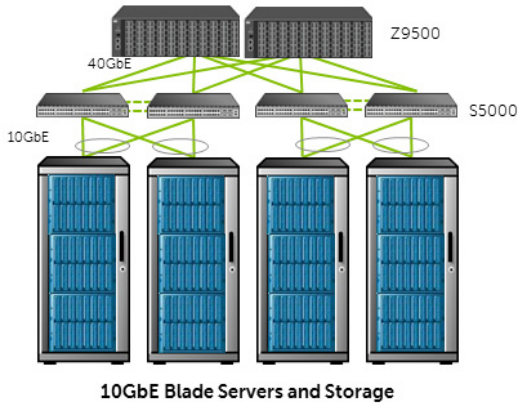


Figure 5. 10GbE blade servers in a virtualized data center

For organizations creating the next-generation architecture for their information technology, meeting performance requirements for critical workloads is paramount. Dell blade solutions combine high-speed connectivity in the form of the backplane of the Dell PowerEdge M1000e blade enclosure with the compute density of Dell blade servers. The MXL/IOA switch for M1000e blade enclosure is a 40GbE capable, modular and stackable blade switch.

In a typical high-density server configuration with redundant connections, up to 4752 10GbE servers can be connected to a pair of Z9500 switches through 58 S5000 switches.

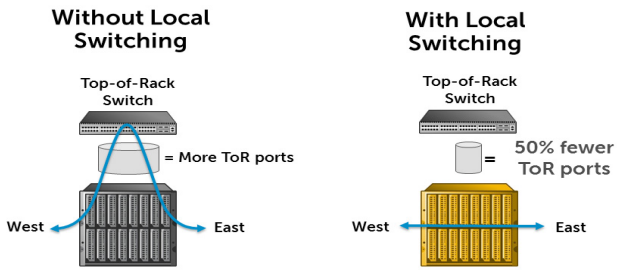


Figure 6. M1000e comparisons showing East/West traffic advantage

Modern data centers are going through a dramatic shift of traffic patterns from mostly north-south to mostly east-west traffic. Dell solutions with local switching capabilities help ensure that server to server traffic will take the least amount of hops, which can significantly enhance application performance.

LAN and SAN convergence

Organizations can take advantage of LAN/SAN convergence by deploying Internet Small Computer System Interface (iSCSI), Fibre Channel over Ethernet (FCoE), or even both network fabrics, on the DCB-enabled network. These technologies allow IT organizations to leverage a single, lossless and converged Ethernet network to enable LAN and SAN convergence.

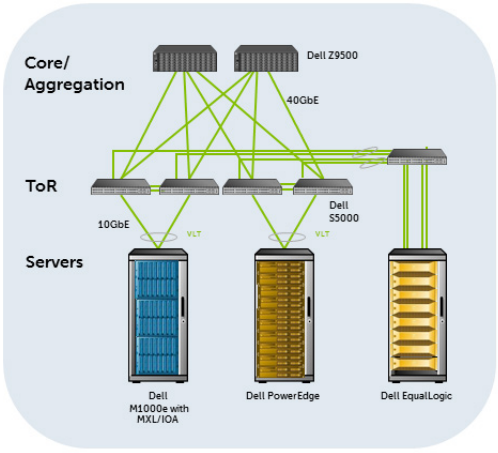


Figure 7. Lossless converged LAN and iSCSI SAN

A typical architecture will connect Dell PowerEdge rack servers directly to S5000 or M1000e blade servers through MXL/IOA blade switches to S5000. Such architecture reduces the number of server and switch optics, fiber optic cables, and number of ToR switches in the data center. This approach can result in simplification of I/O, reduced capital and operational costs, and improved IT staff productivity.

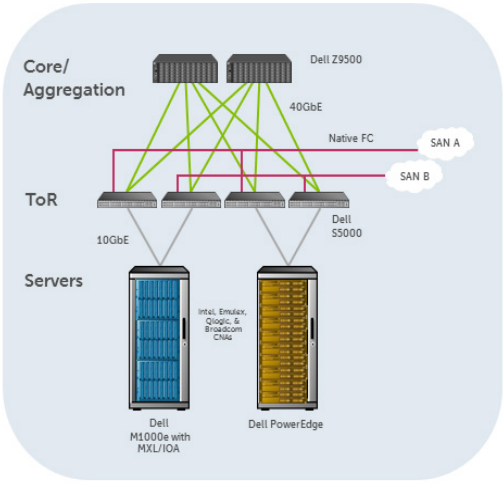


Figure 8. Lossless converged LAN and FCoE SAN

S5000 consolidates LAN and SAN networks on one physical network infrastructure while providing logical separation of LAN and SAN traffic in the network. This approach helps ensure organizations are able to connect to existing FC SANs for non-stop and optimal IT operations while extending the advantages associated with LAN and SAN convergence. A typical architecture will connect Dell PowerEdge rack servers directly to S5000 or M1000e blade servers through MXL/IOA blade switches to S5000.

S5000 acts as an FCF offering direct connectivity to FC storage or as an NPG, offering connectivity between servers and FC SANs. Using 10GbE Converged Network Adapters (CNAs) servers are able to connect to S5000 using FCoE capability. Up to 12 ports on S5000 can be configured for native Fibre Channel connectivity to FC storage, servers or SANs. All Ethernet ports can be connected to FCoE servers.

Specifications: Dell S5000 unified storage Ethernet switch

Ordering Information

S5000
1RU, LAN/SAN Converged Switch, 4x40GbE QSFP+, 4 Modular Bays with 2x AC PSU, 2x Fan Modules, I/O to PSU Airflow, 4-Post Rack Mount Kit
1RU, LAN/SAN Converged Switch, 4x40GbE QSFP+, 4 Modular Bays with 2x AC PSU, 2x Fan Modules, PSU to I/O Airflow, 4-Post Rack Mount Kit
1RU, LAN/SAN Converged Switch, 4x40GbE QSFP+, 4 Modular Bays with 2x DC PSU, 2x Fan Modules, I/O to PSU Airflow, 4-Post Rack Mount Kit
1RU, LAN/SAN Converged Switch, 4x40GbE QSFP+, 4 Modular Bays with 2x DC PSU, 2x Fan Modules, PSU to I/O Airflow, 4-Post Rack Mount Kit
1RU, LAN/SAN Converged Switch, 4x40GbE QSFP+, 4 Modular Bays with 2x AC PSU, 2x Fan Modules, I/O to PSU Airflow, 4-Post Rack Mount Kit, TAA
1RU, LAN/SAN Converged Switch, 4x40GbE QSFP+, 4 Modular Bays with 2x AC PSU, 2x Fan Modules, PSU to I/O Airflow, 4-Post Rack Mount Kit, TAA

Power Supplies
S5000, AC Power Supply, I/O to PSU Airflow, 100–240V, 750W
S5000, AC Power Supply, PSU to I/O Airflow, 100–240V, 750W
S5000, DC Power Supply, I/O to PSU Airflow, -48 to -60V, 1100W
S5000, DC Power Supply, PSU to I/O Airflow, -48 to -60V, 1100W

Fans
S5000, Fan Module, I/O to PSU airflow
S5000, Fan Module, PSU to I/O airflow

Service Side Kits
S5000, Service Side Kit, 2x AC PSU, 2x Fan Modules, I/O to PSU Airflow
S5000, Service Side Kit, 2x AC PSU, 2x Fan Modules, PSU to I/O Airflow
S5000, Service Side Kit, 2x DC PSU, 2x Fan Modules, I/O to PSU Airflow
S5000, Service Side Kit, 2x DC PSU, 2x Fan Modules, PSU to I/O Airflow

Miscellaneous
S5000, Modular I/O Bay Blank Faceplate

Software
Software, OS9: Dell Networking Operating System, Layer 3 Software License
Software, OS9: iSCSI Optimized Configuration, Software License
Software, OS9: FCoE Transit Optimized Configuration
Software, DNOS: FC/FCoE fabric and NPIV Proxy Gateway (NPG), Software License

I/O Modules
S5000, 12-Port Ethernet/FCoE Module 1/10GbE 1/10GBase-T Interconnect
S5000, 12-Port Ethernet/FCoE Module, 1/10GbE SFP+ Interconnect
S5000, 12-Port Unified Port Module, 2/4/8Gbps Native Fibre Channel or 10GbE SFP+ Interconnect

Optics
Transceiver, QSFP+, 40GbE, SR Optics, 850nm Wavelength, 100–150m Reach on OM3/OM4
Transceiver, QSFP+, 40GbE, eSR Optics, 850nm Wavelength, 300–400m Reach on OM3/OM4
Transceiver, SFP+, 10GbE, SR, 850nm Wavelength, 300m Reach
Transceiver, SFP+, 10GbE, SR, 850nm Wavelength, 300m Reach, 12-pack
Transceiver, SFP+, 10GbE, LR, 1310nm Wavelength, 10Km Reach
Transceiver, SFP+, 10GbE, ER, 1310nm Wavelength, 40Km Reach
Transceiver, SFP+, 10GbE, LRM (Long Reach Multimode) Optic, 1310nm Wavelength, 220m Reach on MMF
Transceiver, SFP+, 8Gbps, Fibre Channel-SW, 150m Reach
Transceiver, SFP+, 8Gbps, Fibre Channel-SW, 150m Reach, 12-pack
Transceiver, SFP+, 8Gbps, Fibre Channel-LW, 4Km Reach

Cables
Cable, 40GbE MTP to 4xLC 5M Optical Breakout Cable (optics not included)
Cable, 40GbE QSFP+ to 4xSFP+ 5M Direct Attach Breakout Cable
Cable, 40GbE QSFP+, Active Fiber Optic, 10m
Cable, 40GbE QSFP+, Active Fiber Optic, 50m
Cable, 40GbE QSFP+, Direct Attach Cable, 1m
Cable, 40GbE QSFP+, Direct Attach Cable, 5m
Cable, SFP+, CU, 10GbE, Direct Attach Cable, 0.5m
Cable, SFP+, CU, 10GbE, Direct Attach Cable, 1m
Cable, SFP+, CU, 10GbE, Direct Attach Cable, 3m
Cable, SFP+, CU, 10GbE, Direct Attach Cable, 5m
Cable, SFP+, CU, 10GbE, Direct Attach Cable, 7m

Note: Contact Dell for a more comprehensive SKU list

Physical
Four module slots (Optional Ethernet module or Unified port module)
4 x 40GbE fixed QSFP+ or 1/10GBASE-T ports
48 x 1/10GbE SFP+ with additional 16 x 10GbE SFP+ port
12 x FC 2, 4 or 8Gbps ports
1 RJ45 console/management port with RS232 signaling
Size : 1RU, 1.71 x 17.4 x 28 in (4.4 mm x 441 mm x 711 mm)
Weight: 34 lbs (15.42 kg)
ISO 7779 A-weighted sound pressure level: 59.6 dBA at 73.4°F (23°C)
Power supply: 100 to 240 VAC 50/60 Hz or -48 to -60 VDC
Max. thermal output: 1878 BTU/hr
Max. current draw per system:
- 7A at 100/120 VAC, 3.5A at 200/240 VAC
- 15.2A at -46 VDC, 11.7A at -60 VDC

Max. power consumption: 550 Watts
Typical power consumption: 250 Watts
Max operating specifications:
- Operating temperature: 32°F to 104°F (0°C to 40°C)
- Operating humidity: 10 to 85% (RH), non-condensing

Max non-operating specifications:
- Storage temperature: -40°C to 158°C (-40°C to 70°C)
- Storage humidity: 5 to 95% (RH),non-condensing

High-Availability
Hot swappable redundant power supplies
Hot swappable redundant fans
Field replaceable I/O modules

Performance

MAC addresses:	128K
ARP table:	128K
IPv4 routes:	128K
IPv6 routes:	32K
Switch fabric capacity:	1.28Tbps (full-duplex) 640Gbps (half-duplex)
Forwarding capacity:	960Mpps
Link aggregation:	8 links per group, 128 groups per stack
Queues per port:	4 queues
VLANs:	4K
Line-rate layer 2 switching:	All protocols, including IPv4
Line-rate layer 3 routing:	IPv4
IP ACL:	Ingress 1023; egress: 716
ACLs:	2K ingress, 1k egress
LAGs:	128 with up to 8
LAG load balancing:	Based on layer 2, IPv4 headers
Packet buffer memory:	9MB
CPU memory:	2GB
FCoE VLANS (Fabric Mode):	1
FCoE VLANs (NPIV Mode):	12
FCoE VLANS (FSB Mode):	8
Jumbo Frames:	12,000 bytes

IEEE Compliance

802.1AB	LLDP
802.1ag	Connectivity Fault Management
802.1D	Bridging, STP
802.1p	L2 Prioritization
802.1Q	VLAN Tagging, Double VLAN Tagging, GVRP
802.1s	MSTP
802.1w	RSTP
802.1X	Network Access Control
802.3ab	Gigabit Ethernet (1000BASE-T)
802.3ac	Frame Extensions for VLAN Tagging
802.3ad	Link Aggregation with LACP
802.3ae	10 Gigabit Ethernet (10GBASE-X)
802.3ba	40 Gigabit Ethernet (40GBase-SR4, 40GBase-CR4) on Optical Ports
802.3u	Fast Ethernet (100BASE-TX) on Management Ports
802.3x	Flow Control
802.3z	Gigabit Ethernet (1000BASE-X)
ANSI/TIA-1057	LLDP-MED
Force10	PVST+
MTU	12,000 bytes

RFC and I-D Compliance

General Internet protocols

768	UDP
793	TCP
854	Telnet
959	FTP

General IPv4 protocols

791	IPv4
792	ICMP
826	ARP
1027	Proxy ARP
1035	DNS (client)
1042	Ethernet Transmission
1305	NTPv3
1519	CIDR
1542	BOOTP (relay)
1812	Requirements for IPv4 Routers
1918	Address Allocation for Private Internets
2474	Diffserv Field in IPv4 and Ipv6 Headers
2596	Assured Forwarding PHB Group
3164	BSD Syslog
3195	Reliable Delivery for Syslog
3246	Expedited Assured Forwarding
4364	VRF-Lite (IPv4 VRF with OSPF, BGP, IS-IS and v4 multicast
5798	VRRP

General IPv6 protocols

1981	Path MTU Discovery Features
2460	Internet Protocol, Version 6 (IPv6) Specification
2464	Transmission of IPv6 Packets over Ethernet Networks
2710	Multicast Listener Discovery (MLD) for IPv6
2711	IPv6 Router Alert Option
3810	Multicast Listener Discovery Version 2 (MLDv2) for IPv6
4007	IPv6 Scoped Address Architecture
4213	Basic Transition Mechanisms for IPv6 Hosts and Routers
4291	IPv6 Addressing Architecture
4443	ICMP for IPv6
4861	Neighbor Discovery for IPv6
4862	IPv6 Stateless Address Autoconfiguration
5095	Deprecation of Type 0 Routing Headers in IPv6

IPv6 Management support (telnet, FTP, TACACS, RADIUS, SSH, NTP)
VRF-Lite (IPv6 VRF with OSPFv3, BGPv6, IS-IS)

Security

2404	The Use of HMAC-SHA-1-96 within ESP and AH
2865	RADIUS
3162	Radius and IPv6
3579	Radius support for EAP
3580	802.1X with RADIUS
3768	EAP
3826	AES Cipher Algorithm in the SNMP User Base Security Model
4250, 4251, 4252, 4253, 4254	SSHv2
4301	Security Architecture for IPSec
4302	IPSec Authentication Header
4303	ESP Protocol
4807	IPsecv Security Policy DB MIB

RIP

1058	RIPv1
2453	RIPv2

OSPF (v2/v3)

1587	NSSA
2154	OSPF Digital Signatures
2328	OSPFv2
2370	Opaque LSA
4552	Authentication/ Confidentiality for OSPFv3
5340	OSPF for IPv6

BGP

1997	Communities
2385	MD5
2545	BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
2439	Route Flap Damping
2796	Route Reflection
2842	Capabilities
2858	Multiprotocol Extensions
2918	Route Refresh
3065	Confederations
4360	Extended Communities
4893	4-byte ASN
5396	4-byte ASN representations

draft-ietf-idr-bgp4-20 BGPv4
draft-michaelson-4byte-as-representation-05
4-byte ASN Representation (partial)
draft-ietf-idr-add-paths-04.txt ADD PATH

Multicast

1112	IGMPv1
2236	IGMPv2
3376	IGMPv3

MSDP
draft-ietf-pim-sm-v2-new-05
PIM-SMw

Network convergence
802.1Qbb Priority-Based Flow Control
802.1Qaz Enhanced Transmission Selection (ETS)
Data Center Bridging eXchange (DCBx)
DCBx Application TLV (iSCSI, FCoE)
Fibre Channel over Ethernet (FCoE)
iSCSI over DCB (lossless iSCSI)
RDMA over Converged Ethernet (RoCE)

Fibre Channel (requires license)
Fibre Channel Forwarding (FCF)
NPIV Proxy Gateway (NPG)
Fibre Channel port types: F, E, NP, VF
Bridging to FC SAN
Up to 12 FCoE_Maps per switch
Fabric Shortest Path First (FSPF)
Name server
Zoning

FCoE features (requires license)
FC-BB-5 support
Native FCoE forwarding
FCoE Initialization Protocol (FIP) v1
Connectivity to FIP Snooping Bridge
FCoE Transit (FIP Snooping Bridge)
FCoE to FC Forwarding
Dynamic FCoE to FC Load Balancing

Network management

1155	SMIv1
1157	SNMPv1
1212	Concise MIB Definitions
1215	SNMP Traps
1493	Bridges MIB
1850	OSPFv2 MIB
1901	Community-Based SNMPv2
2011	IP MIB
2096	IP Forwarding Table MIB
2578	SMIv2
2579	Textual Conventions for SMIv2
2580	Conformance Statements for SMIv2
2618	RADIUS Authentication MIB
2665	Ethernet-Like Interfaces MIB
2674	Extended Bridge MIB
2787	VRRP MIB
2819	RMON MIB (groups 1, 2, 3, 9)
2863	Interfaces MIB
3273	RMON High Capacity MIB
3410	SNMPv3
3411	SNMPv3 Management Framework
3412	Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
3413	SNMP Applications
3414	User-based Security Model (USM) for SNMPv3
3415	VACM for SNMP
3416	SNMPv2
3417	Transport mappings for SNMP
3418	SNMP MIB
3434	RMON High Capacity Alarm MIB
3584	Coexistance between SNMP v1, v2 and v3
4022	IP MIB
4087	IP Tunnel MIB
4113	UDP MIB
4133	Entity MIB
4292	MIB for IP
4293	MIB for IPv6 Textual Conventions
4502	RMONv2 (groups 1,2,3,9)
5060	PIM MIB

ANSI/TIA-1057 LLDP-MED MIB
Dell_ITA.Rev_1_1 MIB
draft-grant-tacacs-02 TACACS+
draft-ietf-idr-bgp4-mib-06 BGP MIBv1
IEEE 802.1AB LLDP MIB
IEEE 802.1AB LLDP DOT1 MIB
IEEE 802.1AB LLDP DOT3 MIB
sFlow.org sFlowv5
sFlow.org sFlowv5 MIB (version 1.3)
FORCE10-BGP4-V2-MIB Force10 BGP MIB
(draft-ietf-idr-bgp4-mibv2-05)
FORCE10-IF-EXTENSION-MIB
FORCE10-LINKAGG-MIB
FORCE10-COPY-CONFIG-MIB
FORCE10-PRODUCTS-MIB
FORCE10-SS-CHASSIS-MIB
FORCE10-SMI
FORCE10-TC-MIB
FORCE10-TRAP-ALARM-MIB
FORCE10-FORWARDINGPLANE-STATS-MIB
Regulatory compliance

Safety
UL/CSA 60950-1, Second Edition
EN 60950-1, Second Edition
IEC 60950-1, Second Edition Including All National Deviations and Group Differences
EN 60825-1 Safety of Laser Products Part 1: Equipment Classification Requirements and User's Guide
EN 60825-2 Safety of Laser Products Part 2: Safety of Optical Fibre Communication Systems
FDA Regulation 21 CFR 1040.10 and 1040.11

Emissions
Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
Canada: ICES-003, Issue-4, Class A
Europe: EN 55022: 2006+A1:2007 (CISPR 22: 2006), Class A
Japan: VCCI V3/2009 Class A
USA: FCC CFR 47 Part 15, Subpart B:2011, Class A

Immunity
EN 300 386 V1.4.1:2008 EMC for Network Equipment
EN 55024: 1998 + A1: 2001 + A2: 2003
EN 61000-3-2: Harmonic Current Emissions
EN 61000-3-3: Voltage Fluctuations and Flicker
EN 61000-4-2: ESD
EN 61000-4-3: Radiated Immunity
EN 61000-4-4: EFT
EN 61000-4-5: Surge
EN 61000-4-6: Low Frequency Conducted Immunity

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